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THE RAINFALL OF SEPTEMBER, 1896.

SEPTEMBER, 1896, has been so exceptionally wet that we should scarcely be justified in passing it over without special treatment. Moreover, its wetness has been accentuated by the fact that it has followed (I.) an exceptionally long dry period, and (II.) a long series of years without an excessively wet month, so that the short-memoried public has had time to forget what a wet autumn month is like.

We give, in addition to our usual tables of rainfall, a table showing the September total at about 100 stations, for which the average 1880-89 is available, the excess of the month's fall over that average and in a third column the fall expressed as a percentage of the average, which shows at a glance where the total was two-and-a half times, twice, or one-and-a-half times, the average.

Plotting on a map the percentages from this table, as well as similar percentages calculated for the 50 stations printed in the regular table, we see that over a large area in the South of England, extending from Kent to Somerset, about two-and-a-half times the normal amount of rain fell, while over almost the whole of the United Kingdom south of latitude 52°, the stations recorded more than twice the average, the exceptions being Cornwall and mid-Gloucester. Durham and Northumberland show a fall only slightly in excess; Newcastle Town Moor record being even less than the average. In the Fen country, also, the fall was not exceptional, but over the whole of the remainder of England may be said to be 50 per cent. or more in excess.

Over Scotland, generally, the rainfall may be taken as one-and-a-half times the average, but shading off to 125 per cent. in the west, and increasing to 175 per cent. north of latitude 57°.

In Ireland the month was decidedly wetter than in Scotland, having more than twice the average fall over nearly all the southern half of the country, 250 per cent. being exceeded at one or two stations. Towards the north the fall diminished, decreasing to about 125 per cent. in the extreme N.E.

It may be interesting to state that in the tables there is not one entry three times the average, and only one entry of a minus difference.

Rainfall of September, 1896.

Division.	STATION.	Total Rain.	Excess over Aver. 1880-89	Per cent. of Average.	Division.	STATION.	Total Rain.	Excess over Aver. 1880-89	Per cent. of Average.
		in.	in.				in.	in.	
I.	Muswell Hill	6·26	3·59	234	VIII.	Neston (Hinderton)	3·45	·62	122
II.	Abinger Hall	8·00	4·85	254	„	Southport (Hesketh Park)	4·43	1·28	141
„	Guildford, Wern Stoke	6·09	3·33	221	IX.	Ripon (HighBank, Mickley)	3·98	1·39	154
„	Sevenoaks (RiverheadVic.)	5·48	2·59	190	„	East Layton	4·07	1·55	162
„	Steyning	8·10	4·76	243	„	Mickleton	3·44	·43	114
„	Hailsham	6·14	3·22	210	„	„ (Lime Kiln Pasture)	3·65	·57	118
„	Alton (Ashdell)	8·24	5·05	258	X.	Haltwhistle (Unthank Hall	4·58	1·16	134
„	Newbury (Welford Park)	6·04	3·40	229	„	Keswick (Bank)	7·81	2·30	142
III.	Kensworth [Dunstable]	6·19	3·39	221	„	„ (Derwent Island)	8·07	3·25	167
„	Slough (Upton Hall)	5·58	3·11	226	„	Grasmere (High Close)	11·10	4·20	161
„	Oxford (Mag. Coll. Laby.)	4·83	2·39	198	XI.	Llanfrechfa Grange	8·16	4·57	227
„	Banbury (Bloxham Grove)	4·85	2·17	181	„	Llandovery	8·08	4·02	199
„	Castle Ashby	6·00	3·43	233	„	CastleMalgwyn [Llechryd]	5·93	2·10	155
„	Pitsford (Sedgebrook)	4·74	2·14	182	„	Rhayader (Nantgwillt)	11·30	6·52	236
„	Wisbeach (Bank House)	3·93	1·00	134	„	Corwen (Rhug Gardens)	5·53	2·83	205
IV.	Harlow (Sheering)	6·19	3·65	244	„	Llanystumdwy (Talarvor)	5·79	2·30	166
„	Saffron Walden (Newport)	6·05	3·75	263	„	Douglas (Victoria Road)	5·59	1·42	134
„	Ipswich (Bishop's Hill)	4·97	2·33	188	XIII.	N.Esk Reserv. [Penicuick]	4·75	1·14	132
„	Rendlesham Hall	3·83	·87	129	„	Leith	3·25	1·27	164
„	Harleston (Rushall Vic.)	5·42	2·51	186	XIV.	Ardrossan	3·93	·88	129
„	Swaffham	5·34	2·34	178	„	Glasgow (Queen's Park)	4·71	1·72	158
V.	Salisbury (Alderbury)	6·21	3·67	245	XVI.	Dollar	5·19	1·90	158
„	Bishop's Cannings	5·90	2·96	201	„	Balquhidder (Stronvar)	7·90	2·56	148
„	Marlborough (Mildenhall)	6·59	3·94	249	„	Dunkeld (Inverbraan)	5·03	1·99	165
„	Swindon, New	5·26	2·89	222	„	Dalnaspidal, H.R.S.	8·19	3·43	172
„	Blandford (Whatcombe)	8·54	5·28	262	XVII.	Keith, H.R.S.	4·75	2·04	175
„	Ashburton (Holne Vic.)	9·33	4·56	196	„	Forres, H.R.S.	3·83	1·46	162
„	„ (Druid Ho.)	8·82	4·91	226	XVIII.	Fearn (Lower Pitkerrie)	3·83	1·95	204
„	Okehampton (Oaklands)	7·70	3·83	199	„	Loch Shiel (Glenaladale)	..	..	..
„	Barnstaple Athenæum	5·68	2·19	163	„	Aviemore, H.R.S.	4·38	1·98	182
„	Lynmouth (Glenthorne)	6·82	3·47	204	XIX.	Invershin	4·82	1·78	159
„	Probus (Lamellyn)	4·61	·94	126	„	Golspie, H.R.S.	4·34	1·86	175
VI.	Clifton (Pembroke Road)	7·35	4·33	243	„	Scourie	6·40	3·01	189
„	Lechlade	5·67	3·24	233	„	Watten, H.R.S.	4·09	1·61	165
„	Great Barrington	5·71	2·73	192	XX.	Pallaskenry (Kilcornan)	5·97	3·76	270
„	Cheltenham (SouthamVil.)	4·67	2·05	178	„	Miltown Malbay	6·02	2·04	151
„	Tewkesbury (Upper Lode)	5·49	3·11	231	XXI.	Gorey (Courtown House)	5·54	2·62	190
„	Ross (The Graig)	5·93	3·43	237	„	Parsonstown (Birr Castle)	5·62	3·19	231
„	Cheadle (The Heath Ho.)	5·03	1·99	165	„	Athlone (Twyford)	5·53	2·28	170
„	Worcester (Diglis Lock)	3·66	1·22	150	„	Mullingar (Belvedere)	5·95	3·05	205
„	„ (Bevere Lock)	3·57	1·22	152	XXII.	Crossmolina (Enniscoe)	6·36	1·89	142
„	Droitwich (Holt Lock)	4·66	2·35	202	XXIII.	Warrenpoint(SummerHill)	5·09	1·89	159
„	Stourport (LincombeLock)	6·01	3·55	244	„	Seaforde	4·57	1·27	138
„	Coventry (Coundon)	4·75	2·01	173	„	Donaghadee	3·93	·79	125
VII.	Ketton Hall [Stamford]	3·75	1·06	139	„	Bushmills (Dundarave)	4·99	·97	124
„	Horncastle (Bucknall)	3·42	·85	133	„	Stewartstown (The Square)	5·33	1·79	151
„	Worksop (Hodsock Priory)	4·26	2·21	208	„	Buncrana (Rockfort)	5·76	1·97	152

The following additional records exceeding seven inches at stations in southern England are sufficiently remarkable to be worth quoting, though of course many larger totals could be given for stations in wet districts.

Middlesex	Hampstead, Branch Hill.....	7·38 in.
Surrey.....	Reigate, Woodhatch Lodge ...	8·09 ,,
	Wallington	7·20 ,,
Kent	Keston Tower	7·81 ,,
Sussex	Steyning.....	8·10 ,,
Hants	Ryde, Town Hall.....	7·80 ,,
	Botley, Curdridge.....	8·18 ,,
	Liss, Lingwood	9·11 ,,
Bucks	Great Marlow	7·11 ,,

That the great rainfall of the month was due more to persistent rain than to any one excessive fall is clearly shown by the following list, which includes all records received, of more than 2·00 in. in the rainfall day.

	in.			in.	
Haslemere, (Hazelhurst)...	2·21	*1st.	Seathwaite.....	2·53	17th.
Dorking (Fir Tor)	2·75	1st.	,, ...	2·11	22nd.
Reigate (Doods)	2·27	1st.	Borrowdale Vic., Rosthwaite	2·13	16th.
Keston Tower	2·62	1st.	Buttermere (Hassness) ...	2·33	17th.
Bury S. Edmunds(Westley)	2·10	1st.	Borrowdale Grange	2·40	17th.
Poole (Parkstone)	2·12	8th.	Builth (Abergwessin Vic.)	2·03	22nd.
Ashburton (Holne Vic) ...	2·08	21st.	Rhiwbryfdir-Oakley Quar.	2·70	23rd.
Liskeard (Wadeland Ter.)	2·02	21st.			

We conclude with extracts from reports with which we have been favoured by correspondents.

Maida Vale. September rainfall 4·72 in., or nearly half-an-inch more than the total for the first five months of the year.

K. J. MARKS.

Dorking, Fir Tor.—The total R for September is 9·73 in. This is far beyond any other month in 23 years, as much as 7·50 in. never having been gauged. F. TAYLOR.

Reigate, Doods.—I registered 8·73 in. of R on 22 days in September, being the maximum in any month during 14 years. The nearest approach to this was 7·00 in. in October, 1891. G. E. PYM.

Tenterden.—The wettest September for 30 years, R 5·69 in.; in September, 1866, 5·56 in. fell. R for the nine months of 1896 only 1·80 in. below average, but ponds are still low and some wells empty.

J. E. MACE.

Tunbridge Wells, Camden Park.—September R 6·71 in. on 25 days, the average for the month being 2·38 in., and the greatest fall previously 4·84 in., in 1885. For the first nine months of the year the total is 19·30 in., the average being 19·35 in. J. WESTON.

* This fall was incorrectly printed as occurring on 2nd in last month's *Mag.*

Chichester, Forest Side Vicarage.—September R 9·57 in. on 25 days, being 7·61 in. more than the average of the previous seven Septembers.

Crowborough, Observatory.—The past month having been the wettest September in 55 years (1842-96), I send the amount for Uckfield, 7·16 in., and Crowborough, 8·01 in. The next wettest September at Crowborough was in 1876, 5·59 in. The wettest Septembers in the Uckfield register were 1852, 6·54 in., and 1866, 6·12 in. Notwithstanding the above heavy fall the total of the 9 months of this year is 3·37 in. below the average. C. LEESON PRINCE.

Long Wittenham.—The wettest September registered in 46 years. September, 1866, 5·60 in.; September, 1876, 5·57 in.; September, 1896, 5·98 in. F. C. CLUTTERBUCK.

Broxbourne.—The wettest month (R 6·17 in.) since July, 1880, when more than seven inches fell. G. J. NEWBERY.

Castle Ashby.—The heaviest September rainfall (6·00 in.) since the record commenced in 1873, the nearest being 5·65 in. in 1876. The only months exceeding six inches are July, 1880, 7·36 in., and October, 1891, 6·33 in. R. G. SCRIVEN.

Ipswich, Clare Lodge.—Rainfall for September, 6·04 in., five times the average of the previous six Septembers, and exceeding every other month but October, 1892, when 6·64 in. fell. On 1st, 2·35 in. fell between 9 a.m. and 3 p.m. E. R. TURNER.

Poole, Parkstone.—Rainfall, September, 1896, 9·23 in., max. fall 2·12 in. on 8th. Average for 14 years, 2·21 in., greatest previous fall, 4·77 in., in September, 1883. Total fall January 1st to September, 30th, 20·16 in.; average for 14 years, 19·41 in. Greatest monthly fall, 1882-95, 8·80 in., in October, 1891. R. H. BARNES.

Clifton, Pembroke Road.—The wettest September (R 7·35 in.) in 40 years, with the exception of 1874 (7·40 in.) and 1868 (7·68 in.). Rainfall considerably more than the total for the preceding five months. R. F. STURGE.

Ross, The Graig.—The following have been the wet Septembers since 1818, in Herefordshire:—

1839	5·57 in.	1866	5·91 in.	1869	5·85 in.
1841	5·80 ,,	1871	6·62 ,,	1876	6·86 ,,
				1896	5·93 ,,

In 1871 and 1876, September, with a greater depth of R than in 1896, had much fewer rainy days. H. SOUTHALL.

Rotherby Hall.—R fell on every day in September, making the total 3·45 in. J. HAMES.

Neston, Hinderton.—September, 1896, is the only month with 27 rainy days since observations commenced in 1868. R. BUSHELL.

Bolton, The Park.—Total R 9·14 in.; 5·34 in. above the average, and 3·95 in. more than that of any September in the preceding 11 years. W. W. MIDGLEY.

Aysgarth Vicarage.—We had 6·02 in. of R in September, the average for 20 years being 3·00 in. This makes 25·89 in. for nine months, as against an average of 26·87 in. F. W. STOW.

Cork, Wellesley Terrace.—Rainfall more than double the average, and the greatest in September for at least 45 years. W. MILLER.

Broadford, Hurdlestown.—R more than double the average of 11 years, and the greatest on record for September. H. A. BENTLEY.

REVIEW

Report of the Director . . . . Liverpool Observatory, Bidston, 1895. Published by order of the Mersey Docks and Harbour Board. The Liverpool Printing . . Company, 1896. 8vo., 48 pages.

WE have had to abridge the title, otherwise it would have occupied many lines—perhaps the hint may be taken next year—it is enough to send a cataloguer into a fit.

Mr. Plummer is evidently bringing Bidston into good order, and his reports are both interesting and useful. While we are very thankful for what he gives us, we have a few suggestions to give him in return. We think that the latitude, longitude, and altitude of an observatory should always be given. It is rather amusing that he gives barometer readings uncorrected for altitude, and yet nowhere tells us what the altitude is, although he gives a table of corrections whence it could be computed.

In the tables of daily results there are a few facts which might be made clearer. "Mean temperature" is determined in many ways; at Bidston it is $\frac{M+m}{2}$ and this might with advantage be put at the top of the column. "Mean temp. of Evaporation" and "Amount of Cloud"; there is nothing to show whether these values are the means of several observations, or the values for 9 a.m. only. "Amount of rain" a — or ... is much clearer than 0·000; by the former one sees the rainy part of a month at once, with the 0·000 one has to look carefully; for the same reason we prefer ·412 to 0·412, because then, falls exceeding an inch are noticed at once.

The Appendix on Gales of Wind is interesting, but it would have been improved by an engraving of the Observatory, and a reproduction of part of the Ordnance Map shaded to show the configuration of the ground (*c.f.* Mr. Curtis's paper on the Holyhead anemometers). We are very glad that Mr. Plummer has given us the catalogue of wonderful pressures at Bidston, and we hope that before long, either by the erection of a Dines's tube anemometer, or in some other way, these records will either be substantiated or corrected.

SEVERE SNOWSTORM IN MELBOURNE, JUNE 22ND, 1896.

Australia is about as far S. of the equator as Arabia is N. of it. Snowstorms are not frequent in the Red Sea. The *Melbourne Argus* might, therefore, well use the strong word "unprecedented" at the beginning of the following note.

MELBOURNE, JUNE 23RD.

An unprecedented event in the history of the Telegraph branch, occurred yesterday, June 22nd, when telegraphic communication by every route from Melbourne to Sydney was completely interrupted through a heavy snowstorm which occurred over a wide area beyond Yass during the early hours of the morning, and brought all the lines down. There are nine different circuits between Melbourne and Sydney, besides some connections from Adelaide, and yesterday morning it was found that the whole of them had been interrupted. Though breakages on one or more of the lines between the Victorian and New South Wales capitals have frequently occurred in the past, such a thing as a general stoppage of telegraphic communication has never been known before. When the exact position of matters was ascertained the public were notified that any messages lodged would be liable to delay, consequently fewer telegrams were received than usual, and it is hoped that business may be dealt with by making use of the trains to and from Sydney, which will carry the telegrams over the break which has occurred. Gangs of linemen have been despatched from Sydney to effect the necessary repairs.

SYDNEY, JUNE 23RD.

Last night provided the coldest weather of the year in Sydney, and exceptionally low temperatures prevailed in other parts of the colony. The thermometer registered in the city at daybreak 42·5 deg., and rose only a few degrees during the whole day. Heavy falls of snow occurred over all the central high lands, the drifts being of sufficient depth at Lawson to stop the passage of the train for over an hour, until the line could be cleared by gangs of workmen. The weight of the snow on the trees broke down several strong saplings.

Dubbo, Cootamundra, Murrumburrah, and stations as far north as Walcha all reported snow as falling.

The weight of the snow broke down last night long lengths of telegraph lines between Picton and Wagga, and was responsible for a complete stoppage of telegraphic communication with Victoria, South Australia, and Tasmania, as well as with all stations south of Picton.

The mountain ranges presented a beautiful spectacle to-day, the heights being hidden in a glistening white mantle of snow. The weather in the country is said to have been the most severe experienced for 20 years.

The tempestuous weather continued to-day (23rd) over the whole of the high lands and coastal districts. Falls of snow are reported from many country districts where snowstorms were previously unknown. Heavy seas are raging along the coast, compelling many vessels to seek shelter. The rainfall for the past two days in Sydney is over three inches, and that for the month is almost the heaviest on record.

THE FROST OF FEBRUARY, 1895.

WE do not profess to remember all the meteorological literature even of one year, but the impression at present occupying our mind is that the exceptional frost of 1895 has not received the study and attention it deserves. It seems to us that the Central Bureaux and the Societies which have numerous stations reporting to them are mostly overworked, so that the respective staffs have as much as they can do to bring out (often terribly after date) vast masses of mean values (which are seldom utilized), and, therefore, that when exceptional phenomena occur no one has time to work up the details, and so the lessons of the event pass unutilized. We have just received a copy of Mr. Mossman's paper,* with its beautiful maps, and we have been trying to see which of the great Government offices or which of the Societies has brought out anything analogous.

We began with the most ably conducted meteorological journal, the *Zeitschrift*, but we have found only a page and a half, and of it only part original, part taken from the *Met. Mag.*, part from a note read by M. Renou at the Paris Academy (which we have not seen). The *Quar. Jour. of the R. Met. Soc.* gives a paper by Messrs. Bayard and Marriott, excellent, if we must not say perfect, as regards England and Wales, and good as regards the whole British Isles, but without a line as to what had occurred on the Continent. In the *Annuaire Soc. Met. de France* Dr. Giraux gives a short note on the frost in the Department of la Marne. In *Ciel et Terre* we have (*a*) a great development of the *Revue Climatologique* usually given by M. Lancaster, and (*b*) a paper by M. Marchal on *Les grands froids observés en Belgique*—a useful historical memoir. Our readers will find several articles upon the frost and its effects in the last volume of the *Met. Mag.*

Mr. Mossman is, therefore, as far as we can trace, the only writer who, besides reporting fully what occurred in his own country, has made the faintest attempt to show why that frost occurred, and what were the leading features of the distribution of pressure over Europe which caused it.

We feel quite sure that it is a mistake to have so many stations that publication of the records falls behind (we have just received one volume referring to 1893!), and that, when an exceptional phenomenon occurs, there are no assistants who can be set to work upon it. We hope that someone will take up the subject, not from a local standpoint, but from a European or a cosmical one; and if we are to wait until the annual volumes are all out in 1898 or 1899, better so than not at all. But why are meteorological publications so behind? Surely because the Directors have too many stations.

Mr. Mossman's paper is very interesting. He shows that, as regards mean temperature, out of 132 years only 5 Januaries were

* *The Frost of* 1895 *in Scotland.* By R. C. MOSSMAN, F.R.S.E., Excerpt *Jour. Scot. Met. Soc.*

colder, and only one (1855) February. For the two months the mean for 1895 (30°·1) was not merely 1°·1 below any previous year, but actually the coldest two months for 132 years. The author gives full details of the frost in Scotland, and of the distribution of its intensity, which is elucidated by a map; but meteorologists who wish to know not merely facts but also causes, will be still more attracted by the charming map of the mean pressure over Europe during the week when the frost was most severe. Mr. Mossman has based this upon the data in the *Bulletin International*, and it shows very plainly the existence of a large high pressure area (about 30·5 in.) at the top of the Gulf of Bothnia.

It will, perhaps, be remembered that the subject of earth temperatures and burst waterpipes was fully discussed in these pages. Mr. Mossman gives much additional information. It was much colder in Scotland than in England, yet there are only two stations which report temperatures at 22 inches deep below 32°, and they were Arbroath, 31°·5, and Poltalloch, 31°. At 2 ft. it would, of course, have been a shade warmer. This may surely be regarded as confirmatory of our statement (*Met. Mag.*, 1895, p. 55).

"Looking back over all the thermometric records, we adhere to our original opinion that at no spot in England did the natural soil in its normal condition become frozen at the depth of 2 ft."

Why water-pipes at that and greater depths burst to such an extent as to cost £50,000 or £100,000 to repair is indicated in the above article, and that argument has not, that we are aware, been controverted.

A LUNAR RAINBOW.

To the Editor of the Meteorological Magazine.

SIR,—While standing on the highest point of the cliffs at Trimingham, in Norfolk, on September 16th, at 8.30 p.m., I observed the somewhat rare phenomenon of a lunar rainbow. Starting from the Cromer, or N.W. direction, and arching over the edge of the cliff towards the little village of Mundesley, the arc lengthened gradually for four or five minutes, until it was a complete bow, both ends reaching the horizon; it remained complete for a minute or two, and then gradually faded out, the northerly end disappearing first. The bow was quite colourless, looking only a milky white upon a fine grey mist lying over the sea. It was, however, quite clearly defined, and appeared to be of the width and radius of an ordinary solar bow. The moon was at an altitude of about 22°, and during the greater part of the time partially covered with a small cloud. The cliffs at Trimingham are 300ft. above the level of the sea.

Yours truly,

E. WHITE WALLIS.

76, *Carlton Hill, N.W., October 8th*, 1896.

WHIRLWINDS, CYCLONES AND TORNADOES.

To the Editor of the Meteorological Magazine.

SIR,—The terminology in the extract on "Whirlwinds," from the *Bridgwater Independent*, of June 13th, 1896, reprinted in the *Meteorological Magazine* for September, pp. 117–119, is somewhat confusing to an American. The writer of that article speaks of a "small cyclone or whirlwind" which visited the neighbourhood of Bridgwater on June 9th, and says, "this somewhat rare phenomenon must not be confounded with the ordinary cyclonic disturbance or 'depression' which is the usual cause of the low barometer, rain and gales of the winter months, and which is generally of sufficient size to cover the whole of the British Isles." He then speaks of "the true whirlwind or cyclone, of which we have recently received such terrible accounts from America."

The confusion here is in the wrong use of the word *cyclone* *Cyclone* should be used only to designate the cyclonic disturbances, depressions, or LOWS, which bring us what, in ordinary conversation, we speak of as storms. These, as the writer above-quoted recognizes, are generally of sufficient size to cover the whole of the British Isles. The much smaller revolving storms, which are distinguished by having a narrow path, seldom over half-a-mile wide, which last at most but an hour or two, and which are comparatively rare in the British Isles and on the Continent, should be called "tornadoes." These are much more frequent and more violent in the United States than anywhere else, and have for that reason, and also because of Finley's thorough study of them during past years, come to be regarded as rather distinctively American phenomena. The "terrible accounts" of damage done in the United States during the past spring and early summer, to which the writer of the article on "Whirlwinds" refers, were accounts of destruction wrought by "tornadoes" and not, as he says, by "cyclones."

Meteorologists in this country as a rule now use the word whirlwind only when speaking of desert or dust whirls. Scott, in his "Elementary Meteorology" (pp. 381–2, 384–5), confines the use of the word tornado to the thunder squalls off the West Coast of Africa, and uses whirlwinds for such phenomena as that at Bridgwater on June 9th last. He apparently makes no mention of our American tornadoes. In Moore's "Meteorology" the word tornado is rightly used on pp. 241–2, in describing a small revolving storm which occurred in Dublin, April 18th, 1850. Dickson ("Meteorology," pp. 89 *et seq.*) includes under whirlwinds, desert whirls, waterspouts and tornadoes, but distinguishes between cyclones and tornadoes, and gives somewhat over a page to a description of our American tornadoes.

As the Bridgwater tornado was but a very weak affair in comparison with most of our American tornadoes, it is perhaps rather natural to prefer the use of the word "whirlwind" in describing it, rather than to use the more formidable "tornado." I believe, however, that it would be well always to use the term "tornado" to designate any revolving storm, of small diameter, which has the characteristics of an American tornado, *e.g.*, the funnel-shaped cloud, the destructive inflowing and ascending winds, the accompanying thunderstorm, &c. There are, of course, tornadoes of various degrees of development and of violence; that at Bridgwater was a very weak affair judged by our standards, but still, as far as I can determine by the reprinted account. it had many of the characteristics of the tornado, and should, I believe, be designated by that name.

Very truly yours,

ROBERT DE C. WARD, F.R.Met.Soc.

Harvard University, Cambridge, Mass., U.S.A., Oct. 1st, 1896.

[We think that most English meteorologists would fully concur with Mr. Ward; but we believe that to the general public cyclone and tornado are almost synonymous, and would be applied indifferently to any wind developing destructive energy.—ED. *M.M.*]

ISOBARS.

To the Editor of the Meteorological Magazine.

SIR,—In the September number of the magazine Dr. Hellmann asks "Who first used the word *isobar*?" and he suggests "perhaps Mr. Babington." In a foot-note you state that Admiral FitzRoy used the word *isobarometric* in 1863—the fuller and original form of the word—but I find that Alex. von Humboldt, in his *Cosmos*, wrote in the year 1843, twenty years earlier, as follows:—"If we connect together by *isobarometric* lines those places which present the same · · · · atmospheric pressure · · · · we shall obtain curves," &c.—*See* Otté's transl. 1st Ed., vol. i., p. 321.

Yours very truly,

J. LARDNER GREEN, F.R.Met.Soc.

Tintinhull, Milford Hill, Salisbury, October 6th, 1896.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, APRIL, 1896.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	Absolute. Minimum. Temp.	Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
England, London	68·4	26	32·8	24	58·6	41·5	40·3	71	114·7	24·0	·55	11	5·3
Malta	67·2	21	44·6	9	63·0	51·2	48·5	75	134·7	37·2	3·34	11	6·5
Mauritius	83·4	3	69·0	28	81·5	72·7	69·7	80	130·9	60·0	3·36	16	5·4
Calcutta	106·8	15	70·0	21	99·4	78·0	69·5	56	159·5	62·0	·05	1	1·3
Bombay	94·8	10	76·2	6	90·5	79·3	75·2	73	141·5	65·4	·00	0	2·1
Ceylon, Colombo	93·0	26	74·5	5	90·9	76·9	74·5	78	158·0	66·0	5·93	19	5·9
Melbourne	81·1	20	40·1	26*b*	67·7	50·0	48·4	69	127·9	31·5	2·71	12	5·5
Adelaide	89·9	4	46·0	28	73·0	54·4	49·2	59	142·1	36·4	3·00	14	5·2
Sydney	83·9	8	51·0	15	71·8	56·9	51·9	73	134·0	40·4	·15	3	2·4
Wellington	69·0	16	40·0	19	61·2	50·4	48·2	76	127·0	26·0	12·15	24	5·1
Auckland	78·0	1	47·0	18	68·2	55·1	51·5	70	131·0	38·0	7·20	20	5·8
Jamaica, Kingston	90·2	5	66·2	14	86·4	69·1	66·6	75	...	...	·86	5	4·0
Trinidad	93·0	24*a*	67·0	7, 8*c*	89·4	69·4	70·5	76	169·0	65·0	2·33	10	...
Grenada	86·2	12	71·0	13	82·9	73·4	67·2	71	155·0	...	5·91	15	3·1
Toronto	79·7	17	18·3	4	54·7	38·1	37·7	74	97·0	15·0	·76	14	6·0
New Brunswick, Fredericton	66·7	20	16·8	9	49·8	27·9	26·3	59	...	...	1·19	8	5·0
Manitoba, Winnipeg	75·3	26	−0·4	2	45·0	27·1	...	...	...	...	5·64	14	7·0
British Columbia, Esquimalt	64·1	24	29·2	3	53·1	38·7	39·8	82	...	...	1·08	14	7·0

a—and 28. *b*—and 27. *c*—20.

REMARKS.

MALTA.—Adopted mean temp. 56°·2, or 3°·6 below the average. Mean hourly velocity of wind 13·1 miles. Average temp of sea 60°·0. Thunderstorms on 8th, 10th and 28th. Lightning on 4th and 6th. Hail on 8th. J. F. DOBSON.

Mauritius.—Mean temp. of air 0°·4 above, of dew point 1°·4 above, and rainfall 2·33 in. below, their respective averages. Mean hourly velocity of wind 9·4 miles, or 1·0 mile below average; extremes, 23·9 on 26th, and 0·0 on 18th; prevailing direction, E.S.E. Lightning on 3rd. Thunder and lightning on 4th, 15th, 16th, 20th and 21st. C. MELDRUM, F.R.S.

CEYLON, COLOMBO.—Thunderstorms occurred on 15 days. Lightning was seen on 7 days. D. G. MANTELL.

Adelaide.—Mean temp. 0°·4 below the average of 39 years. Rainfall 1·26 in. above the average. C. TODD, F.R.S.

Sydney.—Rainfall 5·68 in. below, temperature 0°·1 below, and humidity 5·6 below, their respective averages. H. C. RUSSELL, F.R.S.

Wellington.—A most unpleasant month; showery almost throughout, and some heavy falls of rain. Wind chiefly from S.E. and N.W., and frequently strong. Thunder on 1st, 2nd and 24th. Temperature 1°·2 below, and rainfall 8·63 in. above, their respective averages. R. B. GORE.

Auckland.—An unusually wet month, the rainfall considerably exceeding twice the average. Barometric pressure and mean temperature both slightly above the average. T. F. CHEESEMAN.

JAMAICA, KINGSTON.—Mean hourly velocity of wind 3·5 miles. Rainfall in Kingston and the Island generally one-fifth less than the average. Hail at Christiana on 28th. R. JOHNSTONE.

TRINIDAD.—Rainfall ·30 in. above the average of 30 years. J. H. HART.

SUPPLEMENTARY TABLE OF RAINFALL, SEPTEMBER, 1896.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
II.	Dorking, Abinger Hall .	8·00	XI.	Lake Vyrnwy	9·08
,,	Birchington, Thor	4·77	,,	Corwen, Rhug	5·53
,,	Hailsham	6·14	,,	Criceith, Talarvor.....	5·79
,,	Ryde, Thornbrough	9·52	,,	I. of Man, Douglas	5·59
,,	Emsworth, Redlands ...	7·89	XII.	Stoneykirk, Ardwell Ho.	3·80
,,	Alton, Ashdell	8·24	,,	New Galloway, Glenlee	6·30
III.	Oxford, Magdalen Col..	4·83	,,	Lilliesleaf, Riddell	5·42
,,	Banbury, Bloxham	4·85	XIII.	N. Esk Res. [Penicuick]	4·75
,,	Northampton, Sedgebrook	4·74	,,	Edinburgh, Blacket Pl..	4·47
,,	Alconbury	4·48	XIV.	Glasgow, Queen's Park..	4·71
,,	Wisbech, Bank House...	3·93	XV.	Inverary, Newtown	6·29
IV.	Southend	3·57	,,	Oban, The Corran	6·71
,,	Harlow, Sheering..... ...	6·19	,,	Islay, Gruinart Schools..	3·60
,,	Colchester, Lexden	4·32	XVI.	Dollar.....	5·19
,,	Rendlesham Hall	3·83	,,	Balquhidder, Stronvar...	7·90
,,	Rushall Vicarage	5·42	,,	Ballinluig	3·81
,,	Swaffham	5·23	,,	Dalnaspidal H.R.S.....	8·19
V.	Salisbury, Alderbury ...	6·21	XVII.	Keith H.R.S.....	4·75
,,	Bishop's Cannings	5·90	,,	Forres H.R.S.	3·83
,,	Blandford, Whatcombe .	8·54	XVIII.	Fearn, Lower Pitkerrie..	2·83
,,	Ashburton, Holne Vic...	9·33	,,	N. Uist, Loch Maddy ...	5·43
,,	Okehampton, Oaklands.	7·70	,,	Invergarry.....	5·59
,,	Hartland Abbey	6·42	,,	Aviemore H.R.S.	4·38
,,	Lynmouth, Glenthorne.	6·82	,,	Loch Ness, Drumnadrochit	4·01
,,	Probus, Lamellyn	4·61	XIX.	Invershin	4·82
,,	Wellington, The Avenue	4·71	,,	Scourie	6·40
,,	Wincanton, Stowell Rec.	6·85	,,	Watten H.R.S.....	4·09
VI.	Clifton, Pembroke Road	7·35	XX.	Dunmanway, Coolkelure	10·81
,,	Ross, The Graig	5·93	,,	Cork, Wellesley Terrace	5·60
,,	Wem, Clive Vicarage ...	3·49	,,	Killarney, Woodlawn ...	8·46
,,	Cheadle, The Heath Ho.	5·03	,,	Caher, Duneske	4·87
,,	Worcester, Diglis Lock	3·66	,,	Ballingarry, Hazelfort...	5·64
,,	Coventry, Coundon	4·75	,,	Limerick, Kilcornan ...	5·97
VII.	Ketton Hall [Stamford]	3·75	,,	Broadford, Hurdlestown	5·28
,,	Grantham, Stainby	4·32	,,	Miltown Malbay	6·02
,,	Horncastle, Bucknall ...	3·42	XXI.	Gorey, Courtown House	5·54
,,	Worksop, Hodsck Priory	4·26	,,	Athlone, Twyford	5·53
VIII.	Neston, Hinderton	3·45	,,	Mullingar, Belvedere ...	5·95
,,	Southport, Hesketh Park	4·43	,,	Longford, Currygrane...	5·25
,,	Broughton-in-Furness ...	8·33	XXII.	Woodlawn	6·49
IX.	Ripon, Mickley.....	3·98	,,	Crossmolina, Enniscoe ..	6·36
,,	Melmerby, Baldersby ...	2·65	,,	Collooney, Markree Obs.	5·72
,,	Scarborough, Obs.	2·61	,,	Ballinamore, Lawderdale	...
,,	Middleton, Mickleton ...	3·44	XXIII.	Lough Sheelin, Arley...	4·80
X.	Haltwhistle, Unthank...	4·58	,,	Warrenpoint.....	5·09
,,	Bamburgh	3·58	,,	Seaforde.....	4·57
,,	Keswick, The Bank.....	7·81	,,	Belfast, Springfield	5·13
XI.	Llanfrechfa Grange	8·16	,,	Bushmills, Dundarave..	4·99
,,	Llandovery	8·08	,,	Stewartstown	5·33
,,	Castle Malgwyn	5·93	,,	Killybegs	7·97
,,	Builth, Abergwesyn Vic.	12·30	,,	Lough Swilly, Carrablagh	5·88
,,	Rhayader, Nantgwillt ...	11·30			

SEPTEMBER, 1896.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1880-9.	Greatest Fall in 24 hours. Dpth	Date	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Max. Date	Min. Deg.	Min. Date.	No. of Nights below 32°. In shade.	On grass
			inches.	inches.	in.								
I.	ENGLAND.	London (Camden Square) ...	5·51	+ 3·00	·73	12	22	71·9	8	39·6	21	0	0
II.		Maidstone (Hunton Court)...	7·71	+ 5·12	1·60	12	21	...	...	...	...	...	...
,,		Strathfieldsaye	6·60	...	1·01	24	26	...	...	...	...	...	...
III.		Hitchin	5·85	+ 3·35	1·06	12	23	69·0	5	37·0	20	0	...
,,		Winslow (Addington)	5·96	+ 3·29	1·10	12	22	69·0	8, 9	34·0	21	0	1
IV.		Bury St. Edmunds (Westley)	6·32	+ 3·62	2·10	1	21	66·0	9	42·0	30	0	...
,,		Norwich (Brundall)	3·63	...	·63	24	21	72·0	9	40·0	21	0	0
V.		Weymouth(LangtonHerring)	6·76	+ 4·34	·96	3	25	68·0	9	45·0	21	0	0
,,		Torquay (Cary Green)	5·45	...	1·08	21	28	67·1	26	45·6	21	0	0
,,		Polapit Tamar [Launceston]..	6·17	+ 2·46	1·43	8	24	66·8	10	38·0	21	0	...
VI.		Stroud (Upfield)	5·27	+ 2·36	·85	4	25	68·0	15	41·0	20	0	...
,,		ChurchStretton(Woolstaston)	4·96	+ 2·46	·86	24	26	67·0	10	41·0	28	0	...
,,		Tenbury (Orleton)	3·95	+ 1·34	·74	24	23	67·8	27	33·5	21	0	1
VII.		Leicester (Barkby)	3·73	+ 1·09	·70	24	29	72·0	9	33·0	20	0	1
,,		Boston	3·67	+ ·90	·73	12	20	71·0	10	38·0	21	0	...
,,		Hesley Hall [Tickhill].....	3·71	+ 1·55	·61	4	26	70·0	11	35·0	21	0	...
VIII.		Manchester(PlymouthGrove)	5·28	+ 1·81	·80	22	24	73·0	9,10	40·0	28	0	0
IX.		Wetherby (Ribston Hall) ...	4·67	+ 2·21	·97	10	21	...	...	...	...	...	...
,,		Skipton (Arncliffe)	8·89	+ 4·13	1·52	22	22	..	...	...	...	...	...
,,		Hull (Pearson Park).	3·83	+ 1·39	·63	24	20	70·0	13	36·0	21	0	1
X.		Newcastle (Town Moor)	2·27	— ·51	·70	25	17	...	...	...	...	...	...
,,		Borrowdale (Seathwaite).....	15·26	+ 3·53	2·53	17	25	...	...	...	...	...	...
XI.	WALES.	Cardiff (Ely).....	9·67	+ 5·93	1·53	21	25	...	...	...	...	...	...
,,		Haverfordwest	6·69	+ 2·29	1·25	21	25	66·3	12	38·0	21	0	0
,,		Aberystwith (Gogerddan) ...	7·28	+ 3·01	1·20	24	23	71·0	12	30·0	29	2	...
,,		Llandudno.....	4·77	+ 2·55	·84	4	24	68·0	10	43·8	21	0	...
XII.	SCOTLAND.	Cargen [Dumfries]	5·50	+ 1·94	·92	24	18	70·4	1	34·0	21	0	0
,,		Jedburgh (Sunnyside).....	3·98	+ 1·29	·70	16	28	69·0	10	38·0	22*d*	0	...
XIV.		Colmonell	4·89	...	1·28	27	20	72·0	3	33·0	20	0	...
XV.		Lochgilphead (Kilmory).....	7·01	+ 1·88	1·30	18	21	...	...	35·0	20	0	...
,,		Mull (Quinish).....	5·78	+ ·75	·94	18	22	...	...	...	...	...	...
XVI.		Loch Leven Sluices	4·00	+ 1·21	·60	10*a*	15	...	...	...	...	...	...
,,		Dundee (Eastern Necropolis)	3·85	+ 1·34	·75	9	21	67·0	12	37·1	26	0	...
XVII.		Braemar	4·01	+ 1·15	·76	27	21	63·2	4	31·0	21	1	7
,,		Aberdeen (Cranford)	4·33	...	·75	22	26	63·0	14*b*	32·0	27	1	...
XVIII		Strathconan [Beauly]	6·57	+ 2·89	1·08	23	17	...	...	...	...	...	...
,,		Glencarron Lodge.....	7·76	...	·93	17	20	69·8	12	34·0	27	0	...
,,		Cawdor	3·94	+ 1·19	·77	27	24	...	...	...	...	...	...
XIX.		Dunrobin	4·67	+ 2·08	·77	22	21	62·0	3	38·0	26	0	...
,,		S. Ronaldsay (Roeberry).....	4·73	+ 2·07	·90	17	23	61·0	3	39·0	25	0	...
XX.	IRELAND.	Darrynane Abbey.....	5·81	...	·74	24	25	...	...	...	...	...	...
,,		Waterford (Brook Lodge) ...	6·12	+ 3·20	·96	24	21	68·5	10	36·0	3	0	...
,,		O'Briensbridge (Ross)	7·23	...	·94	24	24	...	...	...	...	...	...
XXI.		Carlow (Browne's Hill)	5·93	+ 3·11	·93	24	24	...	...	...	...	...	...
,,		Dublin (FitzWilliam Square)	5·07	+ 3·10	·95	4	23	68·4	17	41·1	21	0	0
XXII.		Ballinasloe	5·73	+ 2·94	1·03	24	25	64·0	4, 6	34·0	21*e*	0	...
,,		Clifden (Kylemore)	9·15	...	1·85	24	24	...	...	...	...	...	...
XXIII		Waringstown	4·98	+ 1·82	·95	24	26	71·0	12	35·0	20	0	1
,,		Londonderry (Creggan Res.).	5·19	+ 1·41	·81	26	24	...	...	...	...	...	...
,,		Omagh (Edenfel)	4·89	+ 1·51	·86	24	26	68·0	10*c*	35·0	20	0	0

+Shows that the fall was above the average ; —that it was below it.

a—and 15. *b*—and 15, 17. *c*—and 12. *d*—and 30. *e*—and 30.

METEOROLOGICAL NOTES ON SEPTEMBER, 1896.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; T S for Thunderstorm; R for Rain; H for Hail; S for Snow.

ENGLAND.

LONDON, CAMDEN SQUARE.—During the 38 years over which observations extend, no other September had so large a rainfall, the greatest being 5·28 in. in 1871. It is the wettest month since October, 1880, and in the 38 years there have been only five wetter months.

HITCHIN.—Only four wetter months since this record began in 1849; in the first 14 days 4·24 in. fell.

ADDINGTON.—The greatest rainfall ever recorded here in September. On the 25th a great gale did much damage to the apple crop. On the 8th a very heavy TS commenced about 10 p.m., the L being particularly vivid, and one clap of T unusually heavy.

BURY ST. EDMUNDS, WESTLEY.—The wettest month since the register began in 1857, more than 5·00 in. having been recorded in only 8 months during that time. T on 1st; distant T on 11th, 12th, 13th and 20th; TSS on 9th, 10th and 28th.

NORWICH, BRUNDALL.—A rough, rainy month, the wettest September since 1885; R ·97 in. above the average, but the total for the year still 3·55 in. deficient. On 10th ·22 in. of rain fell in 10 minutes. L on 9th, 13th, 19th and 24th; T on 1st, 9th and 13th; H on 13th and 20th; strong gales on 23rd and 25th.

WEYMOUTH, LANGTON HERRING.—By far the wettest September in the last 22 years; the next wettest were 1876 5·50 in., and 1883 4·52 in. The rainfall for September exceeded the aggregate of the five preceding months by 2·27 in. The total for the 9 months is 81 per cent. of the average. Mean 9 a.m. temp. 57°·6, or 0°·4 below the average of 24 years. Solar halo on the 24th, followed by a great gale on the night of the 24th and 25th, which uprooted many trees. TS on the 8th.

TORQUAY, CARY GREEN.—Rainfall 3·22 in. above the average; the fall of 9 months, January to September, being 8·42 in. below the average. Mean temp. 57°·9 or 0°·1 below the average. Duration of sunshine 105 hours, being 59 hours 25 minutes below the average. Two sunless days.

POLAPIT TAMAR [LAUNCESTON].—An exceptionally wet month, in marked contrast to September, 1895, both as regards R and temp. The last 10 days were generally very wild and stormy. The R on the 8th (1·43 in.) has been exceeded only on five occasions during the past 16 years. N.W. gale on 25th; foggy on 26th.

STROUD, UPFIELD.—TS at night on 7th; S.W. gales on 17th and 22nd; severe N.W. gale on 25th; trees blown down.

WOOLSTASTON.—A wet month, there being only four days on which no R fell. Violent storm of T and L with very large H on the 12th. The church here was slightly struck, and several pieces of stone chipped off the font. Heavy gale on the 24th, with wild and stormy weather for some days. Mean temp. 54°·5.

TENBURY, ORLETON.—A cold, wet month, with a rainfall considerably in excess of the average, and the largest amount in September since 1883. Although the days were cold and there was very little sunshine the mean temp. of the month is 1°·3 above the average of 35 years. L on the 8th, and T on the 9th and 20th.

LEICESTER, BARKBY.—R fell on the last two days of August, and on 29 out of 30 days in September. Mean temp. 55°·1. Water in Leicester still slightly

restricted, the late gain being used for storage. The first five months of the year gave 5·16 in. of rain, the last four months 12·32 in. L and T on 8th, 9th, 12th and 20th, and T on 10th.

MANCHESTER, PLYMOUTH GROVE.—The wettest September since observations commenced in 1868, with the exception of September, 1869, when 5·67 in. fell, and 1872 6·79 in. Mean temp. 57°·5.

WALES.

HAVERFORDWEST.—The wettest and most stormy September since 1883, which proved disastrous to the late hay crops and the cereals on the high lands; root crops very much benefited by the R. Gales of exceptional violence on the 21st, and 24th–25th, the latter doing considerable damage to roofs and buildings. On the whole a very equable month as regards temperature.

ABERYSTWITH, GOGERDDAN.—Stormy throughout, and a very strong gale on 25th and 26th.

SCOTLAND.

CARGEN [DUMFRIES].—Exceptionally heavy R and absence of sunshine made this one of the dreariest and dullest Septembers ever experienced. Heavier rainfall was recorded in 1885 (7·30 in.), and 1869 (8·20 in.), but never has so little been seen of the sun; the hours of sunshine being less than half the average. The mean bar. pressure has not been lower since 1869. In the 16 days 14th to 29th, the R on 14 exceeded ·10 in. For the nine months of the year the total is 2·19 in. below the average. A severe gale from S. occurred early on 27th, and T and L on 12th, 15th, 19th and 27th. As a consequence of the unfavourable weather, little progress was made with harvest, and considerable damage has been done to the corn still outstanding.

JEDBURGH.—The rainfall is remarkable for quantity and persistence during the month. This retarded the ingathering of cereal crops very much, and to a certain extent caused damage, not, however, to any grave extent. The turnip crop is very good, and grass lands are in fine condition.

COLMONELL.—Rainfall ·91 in. above the average of 20 years. Mean temp. 55°·4 or 2°·0 above the average.

MULL, QUINISH.—Very fine weather from 1st to 13th, thence to the end of the month a succession of gales from all quarters, with T and H on 15th and 16th.

BRAEMAR.—A cold, bleak and disagreeable month. Sunshine 76 hours 20 minutes only.

ABERDEEN, CRANFORD.—Little sunshine during the month, and much fog in the first fortnight. Bad harvest weather.

S. RONALDSAY, ROEBERRY.—A very wet unsettled month. Mean temp. 50°·4, 1°·4 below the average of six years.

IRELAND.

DARRYNANE ABBEY.—A very wet month, and the second half very wild and stormy.

WATERFORD. BROOK LODGE.—Dense fog on 3rd. T on 9th and 12th, L on 11th and 12th. Heavy gale on 22nd, and gales on 25th and 27th.

O'BRIENSBRIDGE, ROSS.—A very bad harvest month and much injury to crops. Very violent gale for three hours on 24th.

DUBLIN.—Unlike the Septembers of 1893, 1894, and 1895, all of which were fine and summer like, this month was unsettled, stormy, and excessively wet throughout. The mean temp. 55°·8 is exactly equal to the average ; the mean atmospheric pressure was however largely in defect. The rainfall is the greatest on record, being more than double the average. High winds were noted on 15 days, and attained the force of a gale on 14th, 16th, 17th, 22nd, 23rd 25th and 27th. L on the 9th, 10th, 12th and 27th. Foggy on the 4th and 9th ; H on 19th ; lunar halo on 16th, solar halo on 18th.

WARINGSTOWN.—The R of September, 1896, has only once been equalled since the record commenced in 1861, viz., in 1882, when exactly the same amount fell in September as this year ; but it fell on 18 days instead of 26, and consequently was not so detrimental to the harvest. Much of the oat crop is still out, and some of it seriously damaged.

OMAGH, EDENFEL.—Although the rainfall of September, 1896, has been exceeded three times in the 32 years recorded here, viz., 1872, 1879 and 1885, it is doubtful if in any of those years the fall was more persistent or the atmospheric conditions more disturbed ; the wind, temperature, and pressure daily undergoing sudden and sometimes violent changes. The damage done to the crops has been accordingly very serious, and exceeds that of the above years in proportion to this year's more abundant promise.

TORNADO IN PARIS.

ABOUT 3 p.m. on September 10th, a tornado passed over Paris. It began at the Place St. Sulpice and ended at the Boulevard de la Villette, a distance of nearly two miles. The apparatus at the Meteorological Bureau and the Eiffel Tower were not affected by it, as they are not within that area. M. Angot, head of the Meteorological Bureau, was at the Pont Royal, about to take a boat, when he noticed small dark clouds, very low down, apparently moving against the wind, which was not at all high, the velocity not being more than five or six yards a second. He soon perceived that the clouds had a rapid circular motion, not horizontal, but oblique. He believes that the tornado, when he first observed it, was a mile distant, and that its diameter was about 170 yards.

The meteorologist at the Tour St. Jacques states that the storm lasted less than a minute. Some black clouds passed swiftly overhead and there was one flash of lightning. The barometer suddenly fell from 748mm. to 742mm., but immediately rose again. An omnibus was overturned on the Pont au Change and another in the Place du Châtelet, and in the Rue de Harlay a cab was thrown over and the driver killed. Stalls in the flower market in the Place St. Sulpice were carried away, and an omnibus driver was blown from his seat and broke his leg. One side of the Palais de Justice had its windows broken and part of the roof blown off. The roofs of the Opéra Comique, the Châtelet, and the Tribunal of Commerce, were damaged, and the Prefecture of Police had two heavy doors wrenched off, and a sentry box carried some distance away. Kiosks and shop fronts were shattered and tables and chairs outside cafés were carried away. In addition there is the usual list of trees torn up, and chimneys overthrown. Seven persons were killed and many seriously injured, several of whom were not expected to recover